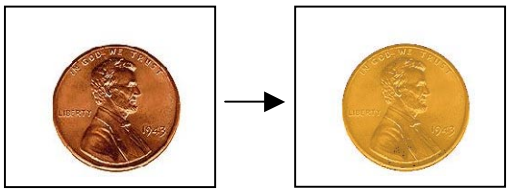
Activity # 14

Title: The Brass Penny-ANSWER KEY



1. Define:

Brass – An alloy consisting mainly of copper and zinc in variable proportions

Alloy – A substance composed of two or more metals intimately united by being dissolved in each other when molten

Caustic – Capable of destroying or eating away by chemical action

Corrosive – Having the power to wear away gradually by chemical action

Etch (as related to metallurgy) – To cut into the surface by the action of acid

2. Post-1982 pennies have zinc cores which will melt at relatively low temperatures. If overheated, the molten metal could spill onto the counter top and splash those nearby.

3. The etching process appeared to clean (brighten) the penny. It prepared the surface to receive the zinc.

4. The silvery substance on the surface of the penny was very small particles of zinc (from the granular zinc in the evaporating dish).

5. After being heated the penny's surface was changed to brass…causing it to change from brownish-amber to gold in color.

6. The heat was necessary to melt the zinc coating on the penny that allowed it to sink down into (and in between) the molecules of copper on the penny's surface. This produced the solution (alloy) brass.

7. Physical properties:

Zinc – gray to silvery in color, light-weight, non magnetic, solid

Copper – brown to amber in color , heavy (high density), non-magnetic, solid

8. The gold color of brass is considered to be more attractive that copper or zinc in appearance by most people. Brass is also more resistant to tarnishing than either zinc or copper—one reason it used extensively in marine hardware on boats or similar applications. Brass is also harder than either copper or zinc and less expensive than pure copper.

9. The zinc was the solute because it was melted (into a liquid) which then dissolved the solid copper of the penny's surface.

10. Protecting the brass surface from air, acid rain, or other corrosive substances by coating the penny with a clear seal of plastic or polyurethane will maintain its luster. Merely storing the brass penny in an airtight (which would also be waterproof) container would also preserve its shiny appearance.